1. Identification

Product identifier: Cyclohexanone

Other means of identification:
- CAS number: 108-94-1

Recommended use: General purpose solvent.

Recommended restrictions: Use in accordance with manufacturer's recommendations.

Manufacturer/Importer/Supplier/Distributor information

Company Name: Greenfield Global USA Inc.
Address: 1101 Isaac Shelby Drive
            Shelbyville, KY 40065
USA
Telephone: 502.232.7600
Fax: 502.633.6100

Company Name: Greenfield Global USA Inc.
Address: 58 Vale Road
            Brookfield, CT 06804
USA
Telephone: 203.740.3471
Fax: 203.740.3481

Emergency phone number

USA: CHEMTREC: 1.800.424.9300 (CCN 17213)
International: CHEMTREC: +1.703.527.3887 (CCN 17213)

2. Hazard(s) identification

Physical hazards: Flammable liquids - Category 3

Health hazards:
- Acute toxicity, oral - Category 4
- Acute toxicity, dermal - Category 4
- Acute toxicity, inhalation - Category 4
- Skin corrosion/irritation - Category 2
- Serious eye damage/eye irritation - Category 1

OSHA defined hazards: Not classified.

Label elements

Signal word: Danger


Precautionary statement

Prevention:
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Avoid breathing vapors. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area.
- Wear protective gloves/protective clothing. Wear protective gloves/eye protection/face protection.
**Response**

If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell. In case of fire: Use appropriate media to extinguish.

**Storage**

Store in a well-ventilated place. Keep cool.

**Disposal**

Dispose of contents/container in accordance with local/regional/national/international regulations.

**Hazard(s) not otherwise classified (HNOC)**

None known.

**Supplemental information**

None.

### 3. Composition/information on ingredients

**Substances**

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclohexanone</td>
<td></td>
<td>108-94-1</td>
<td>100</td>
</tr>
</tbody>
</table>

**Composition comments**

All concentrations are in percent by weight unless otherwise indicated.

### 4. First-aid measures

#### Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Call a poison center or doctor/physician if you feel unwell.

#### Skin contact

Take off immediately all contaminated clothing. Rinse skin with water/shower. Get medical advice/attention if you feel unwell. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

#### Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

#### Ingestion

Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn’t get into the lungs. Get medical advice/attention if you feel unwell.

**Most important symptoms/effects, acute and delayed**

Headache. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain.

**Indication of immediate medical attention and special treatment needed**

Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

**General information**

Take off all contaminated clothing immediately. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

### 5. Fire-fighting measures

**Suitable extinguishing media**

Water fog. Alcohol resistant foam. Dry chemical powder. Carbon dioxide (CO2).

**Unsuitable extinguishing media**

Do not use water jet as an extinguisher, as this will spread the fire.

**Specific hazards arising from the chemical**

Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed. Combustion products may include: carbon oxides.

**Special protective equipment and precautions for firefighters**

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Fire fighting equipment/instructions**

In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool.

**Specific methods**

Use standard firefighting procedures and consider the hazards of other involved materials.

**General fire hazards**

Flammable liquid and vapor.
6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**
Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of vapors and spray mists. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

**Methods and materials for containment and cleaning up**
Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

**Environmental precautions**
Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

**Precautions for safe handling**
Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Do not get this material in contact with eyes. Do not taste or swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing mist/vapor. Avoid prolonged exposure. When using, do not eat, drink or smoke. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Wash contaminated clothing before reuse. Observe good industrial hygiene practices.

**Conditions for safe storage, including any incompatibilities**
Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclohexanone (CAS 108-94-1)</td>
<td>PEL</td>
<td>200 mg/m3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 ppm</td>
</tr>
</tbody>
</table>

**US. ACGIH Threshold Limit Values**

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclohexanone (CAS 108-94-1)</td>
<td>STEL</td>
<td>50 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>20 ppm</td>
</tr>
</tbody>
</table>

**US. NIOSH: Pocket Guide to Chemical Hazards**

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclohexanone (CAS 108-94-1)</td>
<td>TWA</td>
<td>100 mg/m3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25 ppm</td>
</tr>
</tbody>
</table>

**Biological limit values**

<table>
<thead>
<tr>
<th>Material</th>
<th>Value</th>
<th>Determinant</th>
<th>Specimen</th>
<th>Sampling Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclohexanone (CAS 108-94-1)</td>
<td>80 mg/l</td>
<td>1,2-Cyclohexanediol, with hydrolysis</td>
<td>Urine</td>
<td>*</td>
</tr>
</tbody>
</table>

Cyclohexanone

944813   Version #: 01   Revision date: -   Issue date: 20-August-2018

SDS US

3 / 8
### Exposure guidelines

**US - California OELs: Skin designation**
- Cyclohexanone (CAS 108-94-1)
  - Can be absorbed through the skin.

**US - Minnesota Haz Subs: Skin designation applies**
- Cyclohexanone (CAS 108-94-1)
  - Skin designation applies.

**US - Tennessee OELs: Skin designation**
- Cyclohexanone (CAS 108-94-1)
  - Can be absorbed through the skin.

**US ACGIH Threshold Limit Values: Skin designation**
- Cyclohexanone (CAS 108-94-1)
  - Can be absorbed through the skin.

**US. NIOSH: Pocket Guide to Chemical Hazards**
- Cyclohexanone (CAS 108-94-1)
  - Can be absorbed through the skin.

### Appropriate engineering controls

Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station and safety shower.

### Individual protection measures, such as personal protective equipment

**Eye/face protection**
- Wear approved chemical safety goggles.

**Skin protection**

- **Hand protection**
  Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier. Be aware that the liquid may penetrate the gloves. Frequent change is advisable.

- **Skin protection**

- **Other**

**Respiratory protection**
- If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: Chemical respirator with organic vapor cartridge.

**Thermal hazards**
- Wear appropriate thermal protective clothing, when necessary.

**General hygiene considerations**
- When using do not smoke. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

### 9. Physical and chemical properties

**Appearance**
- **Physical state**: Liquid.
- **Form**: Liquid.
- **Color**: Colorless, clear.

**Odor**
- Not available.

**Odor threshold**
- Not available.

**pH**
- Not available.

**Melting point/freezing point**
- -52.6 °F (-47 °C)

**Initial boiling point and boiling range**
- 312.8 °F (156 °C)

**Flash point**
- 111.2 °F (44.0 °C) Closed Cup

**Evaporation rate**
- Not available.

**Flammability (solid, gas)**
- Not applicable.

**Upper/lower flammability or explosive limits**
- **Flammability limit - lower (%)**
  - 1.1 % v/v
Flammability limit - upper (\%) 9.4 % v/v

Vapor pressure 4.5 hPa at 25 °C (68 °F (20 °C))
Vapor density 3.4
Relative density 0.947 g/cm³ (77 °F (25 °C))
Auto-ignition temperature 788 °F (420 °C)
Decomposition temperature Not available.
Viscosity Not available.

Other information
Explosive properties Not explosive.
Molecular formula C6-H10-O
Molecular weight 98.14 g/mol
Oxidizing properties Not oxidizing.

10. Stability and reactivity
Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability Material is stable under normal conditions.
Possibility of hazardous reactions Hazardous polymerization does not occur.
Conditions to avoid Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials Strong oxidizing agents. Nitric acid.
Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information
Information on likely routes of exposure
Inhalation Harmful if inhaled.
Skin contact Harmful in contact with skin. Causes skin irritation.
Eye contact Causes serious eye damage.
Ingestion Harmful if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics Headache. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain.

Information on toxicological effects
Acute toxicity Harmful if inhaled. Harmful in contact with skin. Harmful if swallowed.

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclohexanone (CAS 108-94-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rabbit</td>
<td>948 mg/kg</td>
</tr>
<tr>
<td>Oral</td>
<td>Rat</td>
<td>1296 mg/kg</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation Causes skin irritation.
Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization
Respiratory sensitization Not a respiratory sensitizer.
Skin sensitization This product is not expected to cause skin sensitization.
Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity Not classifiable as to carcinogenicity to humans.
IARC Monographs. Overall Evaluation of Carcinogenicity
Cyclohexanone (CAS 108-94-1) 3 Not classifiable as to carcinogenicity to humans.

NTP Report on Carcinogens
Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)
Not regulated.

Reproductive toxicity
This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure
Not classified.

Specific target organ toxicity - repeated exposure
Not classified.

Aspiration hazard
Not an aspiration hazard.

Chronic effects
Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity
The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclohexanone (CAS 108-94-1)</td>
<td>Aquatic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fish</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LC50</td>
<td>Pimephales promelas</td>
</tr>
</tbody>
</table>

Persistence and degradability
No data is available on the degradability of this substance.

Bioaccumulative potential
No data available for this product.

Mobility in soil
No data available.

Other adverse effects
No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions
Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations
Dispose in accordance with all applicable regulations.

Hazardous waste code
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

US RCRA Hazardous Waste U List: Reference
Cyclohexanone (CAS 108-94-1) U057

Waste from residues / unused products
Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging
Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

<table>
<thead>
<tr>
<th>UN number</th>
<th>UN1915</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>Cyclohexanone (Cyclohexanone RQ = 5000 LBS)</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>3</td>
</tr>
<tr>
<td>Subsidiary risk</td>
<td>-</td>
</tr>
<tr>
<td>Label(s)</td>
<td>3</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td>III</td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>No.</td>
</tr>
<tr>
<td>Special precautions for user</td>
<td>Read safety instructions, SDS and emergency procedures before handling.</td>
</tr>
<tr>
<td>Special provisions</td>
<td>B1, IB3, T2, TP1</td>
</tr>
</tbody>
</table>
Packaging exceptions: 150
Packaging non bulk: 203
Packaging bulk: 242

IATA
UN number: UN1915
UN proper shipping name: Cyclohexanone
Transport hazard class(es):
   Class: 3
   Subsidiary risk: -
   Packing group: III
   Environmental hazards: No.
   ERG Code: 3L
Special precautions for user: Read safety instructions, SDS and emergency procedures before handling.

IMDG
UN number: UN1915
UN proper shipping name: CYCLOHEXANONE
Transport hazard class(es):
   Class: 3
   Subsidiary risk: -
   Packing group: III
   Environmental hazards:
      Marine pollutant: No.
   EmS: F-E, S-D
Special precautions for user: Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not established.

15. Regulatory information

US federal regulations
   This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
   TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
      Not regulated.
   CERCLA Hazardous Substance List (40 CFR 302.4)
      Cyclohexanone (CAS 108-94-1) Listed.
   SARA 304 Emergency release notification
      Not regulated.
   OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)
      Not regulated.
Superfund Amendments and Reauthorization Act of 1986 (SARA)
   SARA 302 Extremely hazardous substance
      Not listed.
   SARA 311/312 Hazardous chemical
      Yes
      Classified hazard categories:
         Flammable (gases, aerosols, liquids, or solids)
         Acute toxicity (any route of exposure)
         Skin corrosion or irritation
         Serious eye damage or eye irritation
   SARA 313 (TRI reporting)
      Not regulated.
Other federal regulations
   Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
      Not regulated.
   Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
      Not regulated.
   Safe Drinking Water Act (SDWA)
      Not regulated.
FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

Cyclohexanone (CAS 108-94-1) Low priority

US state regulations

**US. Massachusetts RTK - Substance List**
Cyclohexanone (CAS 108-94-1)

**US. New Jersey Worker and Community Right-to-Know Act**
Cyclohexanone (CAS 108-94-1)

**US. Pennsylvania Worker and Community Right-to-Know Law**
Cyclohexanone (CAS 108-94-1)

**US. Rhode Island RTK**
Cyclohexanone (CAS 108-94-1)

**California Proposition 65**
California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Taiwan Chemical Substance Inventory (TCSI)</td>
<td>Yes</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

**Issue date** 20-August-2018

**Revision date** -

**Version #** 01

**HMIS® ratings**
- Health: 3
- Flammability: 3
- Physical hazard: 0

**Disclaimer**
This product is subject to Greenfield Global USA Inc.’s terms and conditions, which can be found at http://www.greenfield.com/tc-po-us/. Greenfield cannot anticipate all conditions under which this information and this product, or the products of other manufacturers in combination with this product, may be used. The user is responsible for the proper and safe use, handling, storage and disposal of the product, and assumes liability for any loss, injury, damage or expense arising from any failure to do so. The data in this sheet is based on information and experience available at the time of writing.